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## THE TRUE NECK OF THE FEMUR: ITS STRUCTURE AND PATHOLOGY.<sup>1</sup>

BY HENRY J. BIGELOW, M. D.

### II. — PATHOLOGY.

#### IMPACTED FRACTURES.

##### POSTERIOR IMPACTED FRACTURE OF THE BASE OF THE CERVIX.<sup>2</sup>

THE posterior impacted fracture of the base of the cervix often occurs in old people. I have met with it also in middle life, and do not hesitate to express the belief that it is the most common of the fractures of the neck of the thigh bone. That it has not been so considered may be explained by the following considerations: —

1. It has been generally recognized only of late years.
2. The injury may be a comparatively slight one.
3. Its signs are in some cases a shortening and eversion hardly perceptible.
4. When it unites, there may be no lameness to attract subsequent attention.
5. When it proves fatal before union, the impaction may have been disengaged by manipulation or otherwise, during life or after death, — especially by macerating the specimen for preservation.
6. On the other hand, unimpacted fracture of the small part of the neck, usually supposed to be most common, is marked by prominent symptoms: it entails great and persistent lameness, inviting attention and examination after death, however remote, and the specimen when obtained is unmistakable.

The displacement varies greatly in degree. One wall only — the posterior one — is impacted at the intertrochanteric line, where the bone is a mere shell, driving the true neck, or the remains of it, farther beneath the trochanters, and sometimes detaching the latter. The firm anterior wall resists impaction, but bends at the line of fracture as a hinge. If this hinge were vertical, the shaft would be only everted; while if it were transverse, the neck would be only bent and the leg shortened. But as the hinge stands at an angle of about 45°, shorten-

<sup>1</sup> Concluded from page 5.

<sup>2</sup> Figs. 7, 8, and 9.

ing and eversion are nearly equal. Impaction, when slight, is detected by a difficulty of inverting the foot rather than by actual eversion ; and the shortening may seem doubtful.

It is needless to say that the rotated trochanter still sweeps through an arc of which the head of the femur is the centre, and that there is no crepitation. Shortening and eversion, however inconsiderable, point directly to this lesion. A large number both of cases and of specimens are referrible to this type, — impaction behind, with a hinge in front, each at its respective intertrochanteric line. In some of these specimens the neck is bent down nearly to a right angle with the shaft.

The remaining varieties of fracture of the femoral neck are susceptible of classification, and deserve, for the purpose of comparison, to be mentioned in this connection.

#### IMPACTED FRACTURE OF THE HEAD OF THE FEMUR.<sup>1</sup>

The impacted fracture of the head of the femur is rare, and I do not believe it possible to distinguish it from that just described, even if it were desirable to do so. In three cases I have known, there was the same shortening and eversion, and the same comparative ability to move the limb. A woman who has just died of the injury was able to get into and out of bed with but little assistance, and the trochanter, when rotated, swept through its arc. There was no union. The small extremity of the cervix was rather "rebated" than impacted with the head of the femur, and the fracture was "within the capsular ligament."<sup>2</sup>

The firmness of the fragments in such a case is chiefly due to the dense central cone of spongy tissue which projects from the head of the bone and impacts itself in the friable cavity of the cervix. If the cylinder of the cervical portion is simultaneously impacted into the head of the femur, around the base of the cone, immobility is doubly insured.

I have elsewhere expressed the opinion that these conditions are essential to the very exceptional occurrence of bony union of the small part of the cervix. In default of ankylosis, the neck is doubtless absorbed, presenting, after a time, the familiar conditions of an old "united fracture." So that permanent lameness may result from a fracture which, by simulating impaction of the base, promises, at first, bony union, with comparatively little deformity.

#### IMPACTED FRACTURE OF THE WHOLE BASE OF THE CERVIX WITH INVERSION.<sup>3</sup>

The very rare impacted fracture of the neck with inversion, instead

<sup>1</sup> Fig. 10.

<sup>2</sup> See extracts from the Proceedings of the Society for Medical Improvement, this JOURNAL, No. 1, 1875, p. 20.

<sup>3</sup> Figs. 11 and 12.

of eversion which is the rule, occurs when the neck in front slips off its hinge into the cavity of the shaft. This is hardly possible, as I have elsewhere shown, unless the whole posterior intertrochanteric mass, including the trochanters, is fairly detached.

#### UNIMPACTED FRACTURES.

##### FRACTURE OF THE SMALL PART OF THE CERVIX OF THE FEMUR.

The fracture of the small part of the cervix of the femur, which has been usually described as the most common fracture of elderly people, and erroneously as deriving importance from being within the capsular ligament, is a loose fracture, with no interlocking to maintain the immobility of the small extremities, even were they disposed to bony union. Familiarly characterized by increased motion, great pain and disability, much shortening, marked eversion, and the rotation of the shaft upon its axis instead of through an arc, it is not likely to be mistaken even at first sight. But its relations to the capsular ligament are probably uncertain, owing to differences in the size and insertions of the latter.

##### COMMUNUTED FRACTURE OF THE TROCHANTERS AND SHAFT.

Lastly, when the trochanteric portion of the femur is comminuted, the detached neck and head of the bone may be very variously placed in bony union, both as to angle and as to the part which becomes subsequently attached to the shaft.

In completing the list of injuries to be borne in mind while examining a hip with reference to impacted fracture, we may enumerate dislocation, sprain, crack, the rare separation of the epiphyses, and the fracture of the acetabulum into the pelvis.

#### TREATMENT.

A few words of a practical character may be added here. Apart from dislocation, the main object of examination is to decide, with reference to treatment, whether a fracture is loose or impacted. I have demonstrated here and elsewhere the following points, illustrating the difficulty of further diagnosis:—

1. The common impacted fracture of the base of the neck and the rare one of the head may be indistinguishable from each other. 2. A fracture seemingly impacted and promising bony union may yet result in ligamentous union with corresponding lameness. 3. In loose fractures with great shortening, it may be sometimes difficult to distinguish a fracture of the small part of the neck, which does not promise bony union, from that of the trochanters, which does.

But while an accurate diagnosis of such cases is sometimes absolutely impossible, no embarrassment need be felt in the treatment of these injuries. Their treatment is simple.

If to extend a limb means to draw it down, impacted fracture and whatever resembles it should never be extended; but only steadied by weight or splint. On the other hand, a loose fracture with decided shortening should be first drawn down to something like its normal length. Or, more briefly, treatment consists in immobility, with the previous extension of a loose fracture.

A careful review of these injuries thus leads back to a practical rule already usually adopted. But it leads further, and demonstrates conclusively that prolonged and active flexion and rotation of the hip, in search of positive signs, is more than superfluous. Without anæsthesia it entails needless suffering, and with or without it, by loosening impaction or lacerating tissues, it may be disastrous.

The question of dislocation settled, a very brief and gentle examination is alone admissible; chiefly to determine (1) the degree of shortening, (2) whether the shaft rotates through an arc or on its axis. The most useless and damaging examination is that by quick and persistent rotation, and by flexion of the thigh as far as a right angle.

The prognosis, if the patient lives, is favorable for bony union, except in the case of loose fracture of the small part of the cervix, which, if not readily distinguished, had better be disturbed as little as possible.

Familiarity with the posterior impacted fracture of the base of the neck will remove the most frequent source of doubt in the diagnosis of injuries of this region; and the sooner the old classification "intra and extra capsular fracture" is abandoned, the better it will be for science, for diagnosis, and for treatment. In the interest of the patient and of treatment the question should be, "Is the fracture loose or impacted?" and science is often compelled to rest satisfied when this is settled.

#### EXPLANATION OF FIGURES.

Fig. 7. Front view of right femur showing the fractured cervix bending like a hinge at the anterior intertrochanteric line, to allow the posterior impaction. The head of the bone leans more distinctly from the observer than the perspective indicates.

Fig. 8. Rear view of same, showing the cervix impacted beneath the posterior intertrochanteric line. The head of the bone leans towards the observer.

Fig. 9. Horizontal section of the same, showing the anterior hinge and the posterior impaction. The dotted line shows the normal position of the head. The patient who furnished the specimen from which these figures were taken was seventy-two years of age. It will be seen that the prolongation of the true neck has disappeared by senile atrophy, leaving only a few radiating lamellæ. The specimen is of exceptional interest as showing this form of impaction with little comminution or other injury of the bone.

Fig. 10. Impacted fracture of the head of the femur. The patient who furnished this specimen died of pneumonia in two weeks.

Figs. 11 and 12. Impacted fracture of the base with inversion. The anterior view (Fig. 11) shows the neck slipped off its thick hinge, into the cavity of the shaft. To allow this, the whole trochanteric mass must have been detached, as seen in the rear view. (Fig. 12.)

Fig. 13. (See first half of this paper.) Diagram of a section of the head of the femur of a sheep, showing a deep trochanteric fossa. If this fossa were filled with spongy tissue (as seen beneath the dotted line), the posterior neck would be partially concealed, as in the human femur. The analogy, whether true or not, is too striking to be overlooked. A



deeper fossa exists in certain animals, especially South African ruminants, of which I examined sections in the Hunterian Museum in 1868. In this specimen the tendon inserted at the bottom of the fossa is prolonged into the spongy tissue by radiating lamellæ which intersect concentric arches as represented in the diagram, and resist traction to great advantage.

In examining a number of preparations lately made by my friend Dr. Dwight, I am satisfied that the tendency of what I have called the true neck is to attach itself below, where it becomes thin, as a tangent to the inside of the cylinder of the shaft; and also that it may be tolerably well pronounced in a subject six or eight years of age.

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### A CASE OF IMMEDIATE TRANSFUSION.

BY JAMES R. CHADWICK, M. D., OF BOSTON.

MRS. M. N., thirty-two years of age, entered the Massachusetts General Hospital on May 27th, 1874, eleven weeks after the delivery of her second child. The labor had been short, but attended by profuse hæmorrhage; this hæmorrhage had recurred frequently until two weeks before her entrance to the hospital, when it ceased. The convalescence had been satisfactory in other respects, so that she was able to be out at the end of the third week. The repeated losses of blood, however, soon began to undermine her health, previously robust, until she was completely blanched, had a persistent headache, and frequent attacks of syncope; she was in this condition on entering the hospital. Bowels constipated, pulse 108, urine dark-colored.

May 28th. Iron, eggs, broth, and two ounces of sherry three times daily were ordered. Dr. F. Minot, in whose ward the patient lay, invited me to perform transfusion, if I thought advisable. On learning her history, I declined to operate until the ordinary methods of treatment had been tried and found inefficient, not deeming the case a favorable one for transfusion.

On June 2d she was failing, had had nausea and vomiting all night.

June 3d. Less vomiting. Dr. Minot notified me that she was sinking. In view of this I agreed to operate on the following morning. At 6 o'clock P. M. I took these notes of her condition: Great emaciation, sallow waxy complexion, extreme prostration; pulse 118, respiration 30, temperature, 102.8°. A loud souffle with the first sound of the heart was considered to be anæmic. No bruit du diable over the jugular veins. Areas of hepatic and splenic dullness were not enlarged. A drop of blood from her finger was seen to be very deficient in color; under the microscope, the number of both red and white corpuscles was found to be greatly diminished when compared directly with healthy blood. Urine normal, no albumen by nitric acid test; urophæin increased, uroxanthin normal. With microscope no casts, but very few and doubtful disintegrated blood corpuscles.

June 4th. *Operation*, with the assistance of Drs. Minot, Ellis, Lyman,

C. P. Putnam and J. J. Putnam, of Boston, E. J. Forster of Charlestown, L. Wheeler of Worcester, and a number of house-officers and students. Dr. J. J. Putnam furnished the blood. Aveling's instrument for immediate transfusion was used. Dr. Putnam, having seated himself upon a stool beside the bed, extended his left arm by the side of the patient's right arm. A fold of skin over the median basilic vein of the patient was then raised and a transverse incision made: the wound gaped so as to expose the vein to view. The anterior wall of the latter was raised by the forceps, and a V-shaped cut made with the scissors. The afferent nozzle was next taken from the basin, with the fore-finger closely applied to its external end to prevent the escape of the warm water; it was inserted into the vessel without difficulty, and intrusted to an assistant. A direct longitudinal incision was then made into Dr. Putnam's median cephalic vein, but the attempt to introduce the efferent nozzle failed, despite persistent efforts, owing, I believe, to the bifurcation of the vessel just below the opening. Dr. C. P. Putnam now offered his arm, and a similar cut was made directly into the left radial vein; the nozzle, however, could not be inserted until a slight transverse incision had been made in the integument. The afferent nozzle had by this time become filled with blood, so that it had to be withdrawn from the patient's vein, cleared of the clots, refilled with water and reinserted. The rubber tube, likewise filled with warm water, was then affixed to the nozzles, and the process of transfusion inaugurated by the injection of the syringeful of water into the vein, and prosecuted by the repeated filling and emptying of the bulb.

According to the printed directions, sold with the instrument by Messrs. Krohne and Sesemann, of London, the bulb should hold two drachms; on this assumption I based my calculation as to the amount of blood transfused, but a recent measurement of my bulb reveals its capacity to be precisely four drachms, a discrepancy of most vital importance, and one which, in my opinion, contributed largely to bring about the fatal result hereinafter recorded.

The following notes were taken during the operation:—

After sixth evacuation of bulb, pulse 118, some nausea, patient complains of heart-beat and backache. More color in lips and cheeks.

After eleventh, pulse fuller, now 108.

After thirteenth, pulse fuller, now 104; bulb empties less freely.

After nineteenth, pulse 104.

After twentieth, bulb does not fill readily.

After twenty-second, operation terminated.

Some retching after withdrawal of nozzle.

During the operation, Dr. Ellis applied the stethoscope to the chest several times, but failed to detect any change in the character of the respiration or of the heart-sounds. The anæmic souffle was unaffected.

Some difficulty was experienced in stanching the flow of blood from the incised vein. Before I left, the patient expressed herself as feeling much better and stronger than before the operation; she was free from headache or backache.

For the subsequent notes I am indebted to Mr. W. F. Whitney, medical house-officer of the hospital.

10 A. M. Severe rigor, lasting nearly an hour. Extra blankets, brandy, heater to feet, and sulphate of morphia, one fifth of a grain subcutaneously, afforded relief. Brandy punch (3j.) was ordered to be given every hour.

10.30 A. M. Temperature 106.3°.

11 A. M. Temperature 106.4°.

11.30 A. M. All oozing from wound has ceased. Pulse 134; temperature 105.3°.

12 M. Has been vomiting constantly for the last hour. The bandage about the wound is found to have become loosened and at least four or five ounces of blood to have escaped into the bed. A ligature is put around the vein. Some vomiting.

1 P. M. Temperature 104.2°.

3.30 P. M. Vomiting ceased at 3 P. M. Patient is now delirious.

4.30 P. M. Comatose; temperature 103°.

June 5. 8 A. M. Comatose during night; now conscious, recognizing husband. Stimulants. Failed during the day, and died at 7.30 P. M.

*Autopsy* by Dr. Fitz, twenty-six hours after death; the following are his notes:—

*Skin* very pale. A watery blood is pressed from the proximal portion of the incised vein. Right hand moderately œdematous.

*Acute Internal Pachymeningitis.*—Inner surface of the dura mater on both sides shows patches of a thin, delicate, translucent false membrane, very readily detached and containing numerous minute hæmorrhagic spots.

*Increased Fluid in Pericardium.*—About two ounces of clear yellow fluid in pericardium.

*Anæmia.*—The heart, in common with all the other organs of the body, except the spleen, is extremely anæmic. The valves and cavities are healthy; no thrombi in the latter, nor are any found in the pulmonary arteries after careful search.

*Spotted Fatty Degeneration of the Heart.*—Almost the entire inner surface of the left ventricle is spotted with minute yellowish-white opaque points. A section through the walls reveals a similar appearance, but the spots are more thickly clustered and extend into the substance for at least two thirds of its thickness. The right ventricle is in a like condition but to a considerably less extent. The microscope shows these spots to be due to fatty degeneration.

*Edema of Lungs.* — Lungs extensively œdematous. Kidneys pale. Tubules of cortex indistinctly separated. About one third of right kidney is atrophied; the surface is depressed, granular, dirty red, and tough. The veins leading from this part are filled with a firm, decolorized, adherent thrombus, similar to that found in one of the uterine veins, both being unmistakably of long standing.

*Retrogression of Uterus.* — Uterus of normal size. Walls cut with greater ease than usual; surface of section opaque. The membrane lining the cavity presents a tripe-like aspect from the intersection of slightly elevated red ridges.

The urine taken from the bladder at the autopsy was analyzed by Professor Wood with the following result: Color slightly smoky. Reaction slightly acid. Specific gravity, 1012°. Much sediment. Uro-phæin diminished. Uroxanthin increased. Urea, chlorides, and uric acid diminished. Sulphates, earthy and alkaline phosphates normal. Albumen about one per cent. Sediment is chiefly bladder epithelium. Considerable pus. Few renal epithelial cells. A few brown, coarsely granular, and hyaline casts. One blood corpuscle seen in six specimens. The casts were chiefly large, but some were of medium and small size. Hæmatin was present, as shown by brown coagulum of albumen on heating, and also by brown precipitate with sodic tungstate.

*Remarks.* — Neither the train of symptoms presented by this patient, nor the pathological changes found post mortem give a clue to any serious malady other than universal fatty degeneration. The atrophy of one kidney was clearly connected with the thrombosis of the renal and uterine veins, and may unquestionably be referred to the early days of childbed; there was no indication that the functions of the kidneys were impaired. At the autopsy, the most careful search throughout the whole vascular system failed to discover any clot that could awaken a suspicion of embolism such as might be caused by coagulation of blood in transit through the tube. No froth or air-bubbles were found in the vessels.

The fatty degeneration of all the internal organs, and especially of the heart, was the direct result of imperfect nutrition, due to the frequent losses of blood. The diminution in the volume of the circulation, which is the first effect of a hæmorrhage, is soon corrected by the osmotic extraction of serum from all the tissues of the body, but a corresponding deterioration in the quality of the blood results. This poverty of the blood, nature can rectify, if she is given time. Multiply the large losses of blood at short intervals, however, and she succumbs in the effort to make good the extraordinary waste; not only does nutriment fail, but the circulating medium, by means of which it is distributed throughout the economy, is wanting. No wonder, then, that the system is poorly nourished, and soon becomes too far reduced to carry on the functions of

life. This dependence of fatty degeneration upon frequent losses of blood has been recently pointed out by Gusserow,<sup>1</sup> Ponfick,<sup>2</sup> Perl,<sup>3</sup> and others. Ponfick describes the identical spotted fatty heart — of normal size and sound valves — found at our autopsy, as occurring particularly in women who have lost much blood in childbed. According to him, it is associated with a marked reduction in the number of the red blood corpuscles and in the amount of fibrine. Dropsy is almost constant. Perl succeeded in developing this fatty degeneration of the heart in dogs, by bleeding them a few times to a great extent. When small amounts of blood were abstracted quite frequently, no such result was obtained.

The direct practical bearing of these remarks becomes apparent when we realize that the introduction of blood into the vascular system, when it is already filled to about its natural capacity, is quite a different matter from infusing blood when the vessels are empty and collapsed. In the former case, the vascular tension is increased far beyond the normal; the cavities of the heart are obliged to dilate far beyond their natural limits, and must then contract with more than their habitual force in order to propel the augmented volume of the circulation through the comparatively narrow channels. In short, a severe task is imposed upon the heart, for which, in such instances as the present, it is incapacitated by disease. By transfusion we seek to better the quality of the blood, but this end may generally be compassed by other means, so that we have no right to employ transfusion, with its attendant risks, until the other remedies have failed.

The fatal termination in this case was certainly inevitable, but was in all probability hastened by the shock of the operation and the subsequent hæmorrhage, with the attendant mental perturbations, but more particularly by the direct strain to which the heart was subjected by increasing the volume of the circulation.

These views had not taken so definite a shape in my mind before the operation; yet for these very reasons I had designed to restrict the amount transfused to six ounces. In this I was foiled by the erroneous statement of the description bought with my instrument. I transfused eleven ounces instead of six as I supposed, an error — as may be inferred from what has gone before — most prejudicial to the chances of the patient. Recent reflection has convinced me that transfusion is attended by great risk in chronic cases associated with fatty degeneration of the heart, and that this state of the heart is to be suspected in all patients who have been subject to repeated losses of blood. If we decide to employ transfusion, in spite of this unfavorable element, the danger must be as far as possible averted by the introduction of a very small amount of blood at one time, and repeating the process later it

<sup>1</sup> *Archiv für Gynaekologie*, 1871, page 218.

<sup>2</sup> *Berliner Klinische Wochenschrift*, 1873, No. 1.

<sup>3</sup> *Virchow's Archiv*, 1874, page 39.

required; or the poor blood of the patient must be allowed to escape from one arm, while the healthy blood is being injected into the other.

Acting upon these convictions I have advised against the operation in several consultations to which I have been summoned during the past summer. On one occasion I was persuaded to go sixty miles to transfuse lamb's blood into the veins of a consumptive. I went after repeated solicitations and a distinct disavowal—on my part—of any belief in the curative agency of transfusion in such diseases. On examining the patient I found, in addition to extensive disease of both lungs, very labored action of the heart, and obtained the history of much pain and distress in the cardiac region, and a number of fainting turns during the previous month; the patient was likewise greatly emaciated. I represented to the man the peculiar danger which would attend the transfusion of blood into his veins, and finally persuaded him to renounce the project. A month later, however, a more daring surgeon from New York, a German, successfully transfused six ounces of lamb's blood into the patient. My prognostications of the exceptional risk were fully verified by the unusual symptoms subsequent to the operation. There were "sharp pains throughout the back, chest, and limbs" immediately after the operation; on the next day, again "acute pains in the back;" on the following morning, "two fainting spells in quick succession," and a pulse of 130; on the fourth morning, "palpitation of the heart" for half an hour, and again in the afternoon lasting two hours. Since that date no untoward symptoms have occurred, but the patient has recently published a card in the local journals announcing that his condition has not been improved by the operation, and warning others from trying the experiment.

Aveling's instrument worked well. The slight obstacle to the emptying of the bulb after the thirteenth evacuation I attributed at the time to a tilting upwards of the external end of the afferent nozzle in the hands of my assistant, whereby the oblique internal opening was forced against the wall of the vein and thus closed as by a valve. To this view I still hold. The tardy filling of the bulb after the twentieth evacuation may fairly be set down to the anæmic condition produced in the blood-donor after the loss of eleven ounces of blood. The difficulty of obtaining a steady flow from an incised vessel was, I am told, often experienced in the days of frequent blood-letting. I can quite understand, however, that these explanations may not seem satisfactory to those who look with disfavor upon immediate transfusion.

In conclusion let me ask whether the fact that eleven ounces of blood were infused without sensibly modifying the anæmic souffle, taken in connection with the fatty degeneration of the heart, does not throw a little discredit upon the theory that this souffle is due to the impoverished condition of the blood? May not further investigations demonstrate that it is symptomatic of a fatty heart?

RECENT PROGRESS IN MEDICAL CHEMISTRY.<sup>1</sup>

BY E. S. WOOD, M. D.

*Phosphorus.* — On account of the powerful attraction which phosphorus has for oxygen, when the former is in a state of minute subdivision, as is frequently the case in substances suspected to contain it as a poison, and on account of the fact that that property of phosphorus which is chiefly relied upon in Mitscherlich's test (its phosphorescence) can be prevented by the presence of many substances, such as turpentine, the generally accepted antidote, it is extremely desirable to have a good method by which phosphorus can be effectually isolated from organic mixtures without danger of becoming oxidized during the process. In addition to the method of D. A. Van Bastelaer,<sup>2</sup> L. Dusart contributes another<sup>3</sup> which has the advantage of enabling us to preserve for any desired length of time the phosphorus in the form of a stable compound; with this compound one of the characteristic reactions of phosphorus can be obtained, and its non-oxidation is insured. This process depends first, upon the ready solubility of phosphorus in a mixture of equal parts of bisulphide of carbon, ether and alcohol; secondly, upon the easy formation of a compound of sulphur and phosphorus, which is oxidized much less easily than free phosphorus; and thirdly, upon the precipitation of the sulphide of phosphorus thus formed by metallic copper, a compound resulting which can be preserved for an indefinite period, and which, when subjected to the action of nascent hydrogen, disengages phosphoretted hydrogen, an inflammable gas which burns with a green flame.

The process is as follows: To the liquids to be examined is added the mixture of alcohol, ether, and bisulphide of carbon, in which one half per cent. of sulphur has been previously dissolved, in successive portions. This solution is added until it forms an emulsion with the organic liquids. The solids to be examined are finely divided, covered with the solution, and repeatedly shaken. After twenty-four hours' contact, the bisulphide of carbon solution is removed, and the residues treated in the same manner a second and a third time. The mixed bisulphide solutions are filtered rapidly into a retort, and metallic copper freshly reduced by hydrogen is added. Sufficient copper has been added when the last portions remain brilliant after warming a few minutes on a water-bath. This liquid, after standing twenty-four hours, should be distilled over a water-bath. After the distillation, there remains in the retort a little water, fatty matters which float on the surface of the water, a certain amount of extractive matter, and

<sup>1</sup> Concluded from page 12.<sup>2</sup> See this JOURNAL, January 1, 1874.<sup>3</sup> Journal de Chimie Médicale, September, 1874.



the compound of copper with the sulphur and phosphorus. These collected on a filter should be washed with alcohol and then with ether; this process removes the fat and leaves the copper compound as a black, brilliant substance which undergoes no perceptible alteration when exposed to the air. When this substance is placed in a Marsh's apparatus in which hydrogen is being generated, phosphoretted hydrogen is given off, which burns with a green flame. Sulphuretted hydrogen is also formed, and must be separated by passing the mixed gases through a tube filled with pumice-stone saturated with a strong alkaline hydrate. By this method, the phosphorus was detected in the paste made by mixing the ends of two matches with sixty grammes of bread, fatty matters, and like substances.

The following question arose in France in consequence of a report of chemical experts who, finding in the organs of a cadaver, after death under suspicious circumstances, free phosphoric acid and an excess of crystals of triple phosphate, stated as their opinion that the probable cause of death was phosphorus poisoning: "In the absence of the slightest trace of free phosphorus in the suspected matters, and also in the absence of all characteristic post-mortem appearances, such as fatty degeneration of the liver, can experts conclude that phosphorus poisoning has taken place, because they have observed an abnormal amount of phosphoric acid and ammonio-magnesian phosphate in the substances submitted to chemical analysis?" This question was referred to a commission consisting of MM. Gaillard, Grassi, Roucher, and Jules Lefort, who reported as follows:<sup>1</sup> "The proportion of phosphoric acid found in the suspected matters submitted to chemical analysis is no convincing proof that poisoning by phosphorus has taken place." And, further, that "neither the presence nor the quantity of phosphoric acid and crystals of ammonio-magnesian phosphate in the suspected matters can be considered as proofs of poisoning by phosphorus."

*Analogy between Phosphorus, Arsenic, and Antimony.* — Dr. Ch. Roucher refers<sup>2</sup> to a case of mild arsenic poisoning reported by Dr. Gaillard which has several points of interest. Fowler's solution was prescribed for a patient, twenty-two years of age, for an obstinate eczema. Fifteen drops were ordered morning and night for fifteen days, fifteen drops three times a day for the next fifteen days, and after that twenty drops three times a day. This corresponds to about one quarter of a grain of white arsenic for the first fifteen days, one third of a grain for the second fifteen days, and one half a grain daily after the first month. The result was that the first doses were tolerably well borne, there being only slight disturbance of the stomach. The forty-five drops daily caused vomiting and more intense pain in the stomach. The sixty drops daily could not be

<sup>1</sup> Journal de Pharmacie et de Chimie, July and August, 1874.

<sup>2</sup> Annales d'Hygiène, October, 1874.

borne, and as the skin disease was not cured, the patient gave up the treatment. A short time afterwards, however, the eczema disappeared. The arsenic caused some pain in the limbs with symptoms of paralysis. After omitting the Fowler's solution, the paraplegia increased instead of diminished. This being attributed by Dr. Gaillard (who first saw the patient five weeks after the omission of the Fowler's solution) to the continued presence of arsenic in the system, an examination of the urine was made and arsenic detected. Its elimination by the kidneys continued for six and one half weeks after discontinuing the medicine. Seven and one half weeks after its omission, no arsenic could be detected in the urine. After this period the paralysis rapidly disappeared.

This case is remarkable, first, for the tolerance of such large doses by one unaccustomed to its use; and, secondly, for the slowness of the elimination of the poison. Different authors give the time for the elimination of arsenic as from twelve days to a month, and many consider that the opinion can be given that, if arsenic is detected in the organs, it must have been ingested within a month before death. The above case, however, shows that it may require about fifty days for its complete elimination. Whether the elimination after chronic poisoning is slower than after acute remains to be decided.

In connection with this case the author cites experiments with tartar emetic, and shows that the action upon the digestive organs, upon nutrition, and upon the nervous system are the same for both arsenic and antimony. In several cases of phosphorus poisoning reported by Andante, M. Roucher finds similar symptoms produced as in chronic arsenic and antimony poisoning, and he is led to believe that the analogy which marks the chemical properties of these three closely allied elements will be found to exist in regard to their physiological action also.

*On the Physiological Test for Poisons.* — MM. Albertoni and Lusana<sup>1</sup> find that the extractive matters obtained from the various animal fluids and tissues produce death in animals when injected subcutaneously or into the veins. The symptoms produced by such injections are first an increase and then a diminution in the frequency of the pulse, soon a lowering of the temperature, slow respiration, diarrhœa, and certain convulsive and paralytic phenomena, most frequently paraplegia. Ordinary extract of meat, like Liebig's extract, has precisely the same effect; also the substances extracted in the ordinary way from the organs of two sisters who died under suspicious circumstances proved fatal to animals when injected subcutaneously, the symptoms which were produced being the same as those caused by the extract of meat. They conclude, therefore, that it is impossible to affirm that certain organs contain a substance foreign to the organism and capable of producing death, because the extract from those organs has been found to cause the death of an animal when injected subcutaneously.

<sup>1</sup> *Annales d'Hygiène*, July, 1874.

MAREY ON ANIMAL MECHANISM.<sup>1</sup>

Of late years several works have appeared treating of a greater or less part of this subject of Animal Mechanism. Though referring only to the human skeleton, the work of Meyer stands far in advance of all others. The views are correct, and, though hard reading, the book is intelligible. Houghton's *Animal Mechanics* is for the most part incomprehensible to those of us who are not advanced mathematicians, but the looseness of the work in the parts we can understand enables us to bear our exclusion from the rest with philosophy. In Pettigrew's *Animal Locomotion*<sup>2</sup> similar defects are to be observed, with the difference that as the author conceals his ideas in mazes of words instead of labyrinths of figures, it is more easily criticised. With these works in our mind, we have looked forward with much interest to the work now before us. In certain respects we are much disappointed; in others as much pleased. The work is divided into three books: the first treats of Forces and Organs, the second of Functions: Terrestrial Locomotion, and the third of Aerial Locomotion. As may be inferred from the title, the first book embraces a pretty extensive field. We think it a mistake to devote so much space to the correlation of forces and such general principles, for the space does not admit of their receiving justice, and a superficial discussion is unprofitable. The whole of the first book is open to a similar criticism, as it treats of a great number of topics not essential to the plan of the work. Animal heat and electricity might, we think, be dispensed with. The discussion of the evolution theory is interesting and able. The author shows very well how the shape of the bones depends upon the arrangement of the muscles, vessels, etc., though we have doubts if the rule be absolutely true that "there is not a single depression or projection in the skeleton the cause of which cannot be found in an external force, which has acted on the bony matter either to indent it or to draw it forward." There is a good deal about the muscular system that is inaccurate, and a little that we think is quite wrong. The author follows Borelli with a blind confidence that accounts for some of these defects. He quotes this author's comparison of a primitive muscular fibre with a chain composed of minute circular elastic rings, and speaks of the laws governing the manner in which it will recover itself after being stretched, apparently thinking this a parallel case to contraction from a state of repose. The author gives it as a law that "the work done by a muscle will be in proportion to its length and its transverse section; that is to say, to its volume or to its weight." To make this true, it is of course, necessary to assume that the "substance of the muscles, that is to say, of red flesh, presents the same density in the different parts of the animal frame;" but he states this not as an assumption but as an acknowledged fact. We are unable to say this is not true, but we should like to have some proof of its truth before accepting it. Considering the great difference of coarseness of fibre in different parts of the body, and the different kinds of work required by different muscles,

<sup>1</sup> *Animal Mechanism: A Treatise on Terrestrial and Aerial Locomotion.* By E. J. MAREY, Professor at the College of France. (International Scientific Series.) New York: D. Appleton & Co. 1874. Pp. 283.

<sup>2</sup> See this JOURNAL, May 14, 1874.

we should think it very improbable that an ounce of muscle represented always the same potential force. Some muscles, like those of the orbit, are incessantly employed during the waking hours in moving a light unresisting body hither and thither; some, like the muscles of the back, must be kept for a great part of the time in partial contraction; and again others have usually but little to do, and are occasionally called upon for a violent effort. It is hard to believe that the power of all these is the same. Ranvier a year ago showed that there were marked differences both in structure and manner of contracting between the red and the white muscles of the rabbit, and it is not impossible that analogous distinctions can be drawn between different muscles of animals in which all are red. It is surely a serious error to speak of the *rectus abdominis* as a long muscle. By way of putting all our fault-finding together, we must say here that the translator appears to be quite ignorant of anatomy, for he makes utter nonsense of two passages (pp. 75 and 88) by translating the French for *fibula* (*péroné*) into "perinæum."

Leaving general principles, the author turns to the discussion of the phenomena of locomotion on land, as shown by man and the horse; and through air, as shown by insects and birds. We shall limit our discussion to the movements of man. We regret that the mechanism by which movements are effected is not more considered, the author giving us merely the results but not all the steps by which the results are obtained. Thus, while showing the length of contact of each foot with the ground in walking, the rise and oscillation of the pubes, etc., he says little of the muscular action by which this is accomplished. He ignores entirely the bending of the knee. But in spite of these defects, it is impossible to praise too highly the ingenuity displayed in contriving apparatus to record the results, and the accuracy with which it is accomplished. The following is a short summary of the movements in walking. One foot is always on the ground, the one which has completed a step reaching the ground just before the other leaves it. The raising of the latter of course causes the former to bear all the weight, and to make the pressure necessary to start the body. The pressure is not equal throughout, but increases gradually during the greater part of the step and rapidly toward its end, at which moment the forward movement of the body is most rapid. The pubes (and consequently the head) is highest at the middle of the step; for then the supporting leg is nearly straight. At the same moment the pelvis is thrown towards the side of the supporting leg, so that the foot may be nearly under the median line of the body. The variations in the step in running, going up and down stairs, and in the galloping of children are freely discussed. Most ingenious modifications of this apparatus are made for the horse; and that for birds is especially complicated.

If the scientific part were equal to the mechanical, the work would be perfect.

T. D., JR.

## PROCEEDINGS OF THE ROXBURY SOCIETY FOR MEDICAL IMPROVEMENT.

[REPORTED FOR THE JOURNAL.]

A SPECIAL meeting of the society was held on the evening of November 24, 1874, at the house of Dr. F. W. GOSS.

DR. R. T. EDES occupied the chair.

*Veratrum Viride*. — DR. P. O'M. EDSON presented the regular paper for the evening, on the uses of *veratrum viride*, illustrating the same by reports of cases.

The first case was one of croup, in which the symptoms were severe, with high fever and all the indications of a grave case, and one in which exudation was to be expected; but the symptoms abated soon after the exhibition of the *veratrum viride*. No membrane was thrown off, and there was no muco-purulent expectoration. It was believed that the case ended by resolution before exudation had time to take place, a result due, probably, to the prompt action of the drug. In this case he gave a two-ounce mixture containing half a drachm of Norwood's tincture; and of this he ordered a teaspoonful every two hours. The age of the patient was four and a half years.

The second case was that of a stout, plethoric young man, with clonic spasms; his face was injected, his eyes were bright, and his carotids throbbing. He had been similarly affected before, and on former occasions the convulsions had continued for some time after the use of emetics and other treatment. As a result of these former seizures he had been left weak and depressed for several days afterwards. But on this occasion Dr. Edson gave him at once half a drachm of the tincture with the effect of reducing the pulse in one hour from one hundred to seventy. In two hours he was perfectly rational and went to sleep; and in two days he was well.

The third case was one of acute mania from the excessive use of alcoholic stimulants. There was furious delirium. Fifteen drops of the tincture of *veratrum* were given, to be repeated in an hour; but the patient slept and there was no further trouble.

Dr. Edson then spoke of the good effect of the *veratrum viride* in meningitis of children; it is safer than other depressants, as its effect can easily be checked by the exhibition of opium and stimulants, thus differing from aconite and antimony. It is a sedative, reducing the action of the heart and causing general relaxation, and its best results are obtained from small doses often repeated.

In answer to questions Dr. Edson said that he had never given the drug to a child under two and a half years old. In one case he gave on one occasion two drops every two hours, for twelve hours, with no bad effect. One drop would be a dose for a child one year old. The effect should be carefully watched, the patient being visited often while the drug is being administered. *Veratrum* is indicated in cases of rapid pulse due to too great power of the heart, but not in the rapid pulse of debility.

*Croup*. — DR. EDES asked if any member had ever seen a non-membranous case of croup prove fatal.

Dr. GOSS said he had read of such cases, but had not met with any in his own practice.

Dr. ARNOLD thought he had seen the membrane develop in a case of ordinary laryngitis.

Dr. EDES further remarked that some distinguished physicians, whom he named, asserted that they never lose cases by membranous croup, when these are seen by them in season, and that others considered the subsulphate of mercury a specific in this disease. He could hardly believe these statements, and he would like to hear the experience of members and their conclusions from cases in their own practice.

Dr. COTTING, on being appealed to, said he thought that some error existed in the assertions of those who claimed that they had never lost a case by membranous croup, and that such statements should be taken with allowance, though coming from those incapable of intentional deception. An honest and trustworthy gentleman of experience, formerly president of the Norfolk District Medical Society, continues in the belief that he has saved all his patients afflicted with this disease by large and repeated doses of the subsulphate of mercury. Dr. Cotting could only say that such had not been his own experience with that drug, or with any other. This disease is not often within the reach of any drug or treatment, and he is a fortunate practitioner who has never been called to inevitably fatal cases. A favorable termination in a proportion of more than one case in three, of real membranous croup, would, in his opinion, be a better result than has been obtained hitherto. Of course those cases only should be counted where the membrane is obtained and carefully examined. The remarkable success alluded to can apparently be explained only on the supposition that the practitioners have never fallen in with the real disease attended with the membrane.

Membranous croup is the result of a distinct influence, and is as much a disease, *sui generis*, as any other that can be named. The membrane is essential, — laryngitis is not croup, — and the exudation may be only a very thin film, or it may have the thickness and toughness of moistened parchment. It is of a peculiar structure, and a different thing from the exudations or the sloughs accompanying so-called diphtheria. The process of separation is as natural as that of a scab from a sore, and if hastened by violence (as is possible perhaps by harsh emetics) a re-formation may occur with increased suffering and risk. When cast off spontaneously, the membrane may escape observation, but sometimes its ejection even then is accompanied with violent and distressing struggles. The extent of the membrane is very various. Sometimes in nursing infants it covers only the throat, and does not descend into the larynx; and in older children it may appear only on the tonsils. Such cases are ordinarily of little moment. When the exudation is in the larynx, the case is the most distressing of all; if it begin below the larynx, it may be very extensive, reaching far down into the branches of the bronchi, without greatly alarming the bystanders, even up to a fatal termination from the loosened membrane falling in upon itself and causing suffocation. Unless, as is not common, the constitutional disturbance be severe, the approach of the disease is so stealthy that it usually exists several days before its dangerous nature is

suspected. In this it is the very reverse of that suddenly developed, noisy attack misnamed croup, which is only an unimportant attendant upon catarrhal colds; creating great alarm, indeed, but soon passing off if let alone, and being in itself never fatal.

That the membrane is not the disease, nor the cause of death in all cases, is shown by the fact that death occurs after all the membrane has been cast off or before it has become an obstacle to free admission of air. Death has occurred as early as the third day, when there was only a thin film of membrane commencing below the larynx and extending less than an inch — so thin and so adherent that, *post mortem*, it could not be dissected off. In such a case, death takes place from the disease, or its constitutional disturbances, and not from the membrane. In many cases, however, death is caused by imperfect aeration of the blood in the lungs and by the exhaustion from excessive exertions in breathing, continued unremittingly through several days and nights.

Dr. Cotting stated that he had repeatedly seen two or more cases at or about the same time in the same family; in two instances there were two cases in the same family, both of which were fatal. In another family, there were four cases at the same time, three of which recovered. For a number of years the disease seemed very prevalent in this vicinity, seventy-one deaths having occurred by it in the eight years previous to 1860, in a population of twenty thousand, or one death in every forty from all causes; while for the last ten years cases have been almost unknown to members of this society, though the population has more than doubled.

Dr. Cotting believed membranous croup to be a self-limited disease, having a beginning, middle, and ending as distinct and uniform in progress, and as uncontrolled by any means now known, as measles or small-pox. He advocated a mild treatment, nutritious and soothing, with watery vapor (if agreeable) diffused in the apartment or inhaled by the patient.

*Accidental Re-vaccination.* — DR. COTTING showed, on his own person, what he called "a morbid specimen;" and made the following remarks, mostly in answer to questions of members.

While taking vaccine virus from an infant's arm, from a full vesicle of the eighth day, he accidentally touched the back of the second finger of the right hand with the lancet, then having a drop of virus on its point. The wound was too small to be seen even with a magnifier, but it smarted out of proportion to its size. Its location was near the joint at the distal end of the second phalanx. Comprehending its nature and anticipating results always feared by him more than the risk of varioloid, he washed the wound at once as thoroughly as possible, and made every effort to render it innocuous. The smarting continued at intervals through most of the following two days. On the third day there was a feeling of induration around the spot, which took, in the course of the fourth and fifth days, a pimply form. Then followed a somewhat flattened pustular, or rather a semi-vesicular, appearance, on the sixth and following days. On the sixth day there was quite an inflammation (or areola), which on the seventh day extended to the tip of the finger, and upwards to and beyond the second joint. This inflamed part was quite hot, painful, and had a decidedly erysipelatous look. During the seventh, eighth, and ninth days these appearances



continued in a more or less aggravated form, with pain and soreness up and through the arm, and upon the right side of the chest a little below the axilla. There was also considerable constitutional disturbance, manifested in loss of appetite, pains in the bones, and general discomfort. On the ninth day there was a partial subsidence of the symptoms, locally as well as generally, and the wounded part now had a dusky, semi-purulent, and flattened appearance. On the tenth, eleventh, and twelfth days the areola and swelling gradually abated, and a circular scab, a quarter of an inch in diameter, began to form. On the thirteenth day the scab was well defined and prominent. The surrounding skin became pale red, not much swollen, and nearly natural, the epidermis peeling. There was then no severe pain in the arm, except when put upon the stretch or bent, as in an attempt to button a garment. Stiffness and soreness were prominent, and were aggravated by such efforts.

Subsequently, all unpleasant symptoms, except those in the arm, gradually disappeared. The scab fell off on the twenty-ninth day, leaving a depressed, foveated scar of about a quarter of an inch in diameter.

Such is the history, he said, of a second vaccination occurring from the accidental inoculation of virus directly from an infant's arm. Although an interval of more than half a century had elapsed since the first vaccination, the progress of the disease and the local appearances in this case were exactly those witnessed in a large majority of cases of second vaccination where the interval had been only a few months or a few weeks. In his own practice and in that of others, through a period of more than thirty years, he had not in nine cases out of ten seen better results than in this instance. Though his case, shown to three separate societies, was not at first sight recognized as vaccine inoculation by scores of practitioners who had seen it in its earlier stages (with minds misdirected, by reason probably of its unusual locality and the absence of any other hint as to its nature), its perfect similarity to multitudes of cases pronounced "taken" and "protective" during a late epidemic of small-pox was unmistakable to those in the secret as to its origin, and who witnessed its progress from day to day. Had the sore been on the place usually selected for vaccination, it probably would have been recognized at once by all, as it in fact was as soon as its history was suggested.

He had, he said, seen many worse sores from re-vaccination, though this was sufficiently troublesome. That it was pronounced "spurious," or "not a vaccine process," by experts shows, as far as such opinion goes, that a first vaccination does not always run out through lapse of years; and that a second vaccination with the freshest and purest virus may generate a disturbance which in outward appearance has "no specific vaccine process about it." It was this tendency to anomalous disturbance that had hitherto deterred him from submitting to re-vaccination; preferring the risk of variola (to which a frequent and prolonged attendance on the disease had often greatly exposed him) to the chances of the dangerous inflammations and septic affections frequently developed by re-vaccination.

The exceptional possibility of really taking vaccine disease a second time (as any other disease is sometimes so taken) is the only justifiable reason for re-vaccinating any one. This liability is less than is generally admitted. In

the thousands of re-vaccinations witnessed in others' practice and in his own, he had never seen in such re-vaccinations more than half a dozen vesicles, if as many, which, the history untold, would be mistaken by experts for true vesicles of a first vaccination. [In this he finds that he is not wholly alone. Dr. Snow, City Physician of the City of Providence, and a practitioner of unquestioned ability and great experience, says<sup>1</sup> that "in all his experience he has never seen a perfect vaccination produced a second time, in the same person."] If others could report a greater proportion of true vesicles in secondary or other re-vaccinations than he had reported, they had had, said Dr. Cotting, a very different experience from his own.

The protective value of these repeated vaccinations, especially after the second, is still a problem apparently not likely to be solved by the present generation. For himself, one vaccination had proved a complete protection in all degrees of exposure up to the time of his present unfortunate accident; and he had known variola to occur within three months after a re-vaccination which had been as severe and as damaging as that he was still suffering from. If his case, severe as it was, had nothing specific or protective about it, as some asserted, then most of the cases of re-vaccination he had ever seen were not specific; and, affording no increased protection, they were therefore worse than useless.

The crust formed in the present case was as typical in its gross appearances as the average crust from second vaccination. That it possessed specific qualities was shown by the fact that when used for the primary vaccination of an infant, it produced a vesicle at the eighth day as perfect as that from fresh virus used at the same time. But if this result had not followed, and if vaccination with this crust had produced only negative effects, the case would not have differed from the frequent experience of physicians in the use of reputable vaccine crusts. Whether the scab, in the instance under discussion, contained specific matter or not is of little consequence.

As a result of his first vaccination he never had any scar which would be recognized as of vaccine disease, and yet he had been a thousand times more exposed than many who with large and "characteristic" scars have taken varioloid, and that, too, after repeated re-vaccination. This difference in individuals depends on the different degrees of original susceptibility. Cases of second small-pox have occurred most frequently in those who have had it severely in the first instance, and who were greatly marked by it in the first attack. In Dr. Cotting's opinion, his own case therefore demonstrated how unimportant a scar is as an indication of the amount of protection.

Furthermore his case showed by how slight a wound the virus may enter and be absorbed, how quick the absorption may be, and how difficult the extraction of the poison even from the onset.

On being further asked what was his practice, and what he would advise with regard to re-vaccinating, Dr. Cotting said that as it is impossible to predict who in the thousand may be the one liable to a second attack of small-pox, or who may take vaccination a second time, he had been in the habit, during all his professional life, of suggesting a second vaccination, *as a test*, to be

<sup>1</sup> Boston Medical and Surgical Journal, 1871, p. 342.

tried soon after all the stages of the first had been passed, — within six months, let us say. He always considered his patients entitled to so much at his hands, and without additional fee; and many had availed themselves of the privilege. More than this he had not advised, although he had never refused to re-vaccinate any one who requested it, he declining, however, all responsibility for exceptional or bad results. He had preferred in his own case to trust to one vaccination, for the reasons stated. His first vaccination had protected him from variola through so many years, but not from the present miserable "spurious" disorder, which may happen to any one after any number of re-vaccinations, or after variola itself. The injury thus incurred by re-vaccination is beyond computation; and it frequently impairs health for years, or for a life-time. Moreover, there is no certainty that such disorder may not prove fatal; it has done so in more than one instance, and may again in any case. From his present personal experience, Dr. Cotting believed more than ever, with Dr. Seaton, that "re-vaccination was a thing not to be played with."

In Dr. Cotting's opinion, neither vaccination nor small-pox itself would prevent in every instance an attack of second variola or of so-called varioloid; nor was there, from present indications, any probability that small-pox would be removed from off the earth, "stamped out," through this or any other human agency; certainly not by vaccination alone. Vaccination, though an "enormous boon," gained nothing by misrepresentation.

At this late day in the history of the Jennerian operation, the advocacy of repeated re-vaccinations, as practiced by many physicians, especially during epidemics, betrays, if nothing more, the lack of a just estimate of vaccination and a want of confidence in its protective powers not very creditable to the profession.

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## THE SURGEON-GENERAL'S ANNUAL REPORT.

THE annual report of the Surgeon-General of the United States Army for the year ending June 30, 1874, contains, in addition to the usual financial statement and general statistics of the health of the army, some matters worthy of special notice at our hands. The limited prevalence of yellow fever among the troops during the epidemic of the summer of 1873 seems to have been due chiefly to the hygienic precautions adopted, and especially to the prompt removal of the troops from those posts at which the disease was actually introduced, or at which its introduction appeared imminent. The work performed in the record and pension divisions, instead of diminishing, as one would suppose, has actually increased during the past year. With the lapse of time since the close of the war, the labor of investigating applications for pension has become unusually difficult, partly on account of the increased number of cases in which it is necessary to trace the soldier through several hospitals, and partly on account of the inaccuracy of the data furnished.

The publication of the descriptive anatomical catalogue was recommended in 1873 by the Surgeon-General in a letter which sets forth the value of this de-

partment of the museum, and particularly that portion devoted to craniology. The collection of skulls, derived from all parts of the country, is the largest of its kind ever made available for study. Its value is greatly enhanced by the series of cranial measurements, the specimens for which were derived from Indian tribes, and the white and black races. To utilize this collection, a catalogue is indispensable. The publication of this catalogue was also recommended by the Secretary of War and by the House of Representatives, but was not acted upon by the Senate. A delay of two years has thus ensued, and the request is now renewed. It is difficult to understand why there should be any hesitation in granting a sum sufficient for this purpose, in view of the success attending the publication of catalogues of other sections, whereby the value as well as the fame of the museum has been greatly increased.

The second part of the medical and surgical history of the war is now in process of printing, and permission is asked to print an additional edition of the whole work. The value of all that has been done in this department is such, that it is to be hoped that Congress will not withhold the funds necessary to complete satisfactorily what has been so well begun, and has redounded so much to our national credit.

The act reorganizing the staff corps of the army is thus alluded to: "While allowing appointments of assistant surgeons in the army, [it] cuts off two of the five lieutenant-colonels and ten of the sixty majors, thus preventing any promotion for many years to come. This is much to be regretted, as it places the officers of the medical corps below those of all the other staff corps and of the line of the army as regards promotion, which is felt by them as a hardship and injustice, the results of which cannot fail to be most injurious to the best interests of the service." The clause limiting the number of contract surgeons will also act very unfavorably, and "must result either in actual suffering for want of medical attendance, or in largely increased expense to the government." It is hardly necessary for us to comment here upon this legislation. The matter was so thoroughly discussed last year, and the rights of the medical staff were so urgently pressed upon Congress at the time the passage of the bill was pending, that there seems to be little hope for some time to come of anything like justice being done to this much-abused department of the army. Nevertheless, it is evidently the duty of the medical profession not to allow the matter to rest here, but persistently to urge the cause of their brethren in the army, until the rights of the medical staff shall have been properly recognized.

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### THE LESIONS OF THE CEREBELLUM.

In a clinical lecture on the Diagnosis of Lesions of the Cerebellum, reported in the *Lancet* of November 28, Dr. H. Charlton Bastian states that with respect to the functions of the cerebellum we must consider this organ to have no independent function in the province either of mind or of motility, but to be more intimately concerned with the production of bodily movements than

with the evolution of mental phenomena. The fact that an intimate functional relationship exists between the cerebrum and the cerebellum is shown by the circumstance that atrophy of one cerebral hemisphere entails a corresponding atrophy of the opposite half of the cerebellum, though the subordinate and supplementary nature of the cerebellar function is indicated by the fact that atrophy of one side of the cerebellum, when it occurs as the primary event, does not entail any appreciable wasting in the opposite half of the cerebrum.

Dr. Bastian regards the cerebellum as in part a well-spring of motor force, and as in part an organ for the discharge of certain of the functions hitherto supposed to depend upon the so-called "muscular sense," though in respect to these latter attributes he maintains the doctrine that the different impressions upon which they depend lie outside the sphere of consciousness.

Lesions of the lateral lobe of the cerebellum may occur with or without loss of consciousness, according as they are sudden and extensive, or the reverse. Severe occipital or frontal pain, mostly of a paroxysmal character, is often complained of, and vomiting occurs perhaps rather more frequently than with injuries in other parts of the brain. Paralysis of the opposite arm and leg is very often met with, though it is not accompanied with much diminution of sensibility. The paralysis is apt to be more marked in the leg than in the arm, and is generally absent from the face; in these respects differing from the common forms of hemiplegia. It differs also from the kind of paralysis produced by superficial lesions of the cerebral hemispheres, where, though paralysis of the face may be absent, that of the arm is more marked than that of the leg. Speech and deglutition are not usually affected. Blindness may supervene, especially where the superior peduncles are affected, these parts being in close topographical if not functional relation with the corpora quadrigemina or visual centres.

When the lesion exists in the median lobe of the cerebellum, there is great latitude with regard to the symptoms produced. Hemiplegic symptoms are less frequent than when we have to do with lesions of the lateral lobes. In almost all cases of disease of the cerebellum in which excitation of the genital functions has been noticed, the lesion has been situated in the median lobe. Such symptoms have been noted in about one third of the recorded cases of disease of this lobe. They do not present themselves where only the lateral lobes are affected. With the limitation thus indicated there appears to be some foundation for the old phrenological doctrine as to the function of the cerebellum.

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#### THE AGE AT WHICH CHILD-BEARING CEASES.

A PAPER was recently read by Dr. Fordyce Barker before the New York Medical Library and Journal Association, upon "The Age of Women when the Capacity for Child-bearing Ceases." The object of the writer, as reported by the *Medical Record*, was to show that physiologically, and as a matter of experience, there are limits to the reproductive function of women. Ovula-

tion and menstruation, though often coincident, do not necessarily bear to each other the relation of cause and effect, nor does ovulation always occur at the time of menstruation. Menstruation is, therefore, to be regarded as an accidental and incidental phenomenon, and is a flow of blood from the interior of the uterus at stated periods, irrespective of ovulation. Ovulation, but not menstruation, is essential to conception. The occurrence of menstruation in a woman advanced in years is no evidence of the occurrence of ovulation at the same time. When senile atrophy of the ovaries takes place, ovulation ceases and conception is no longer possible. Usually this period is reached between the fortieth and fiftieth year of the woman's age. In very exceptional cases this change does not take place until from one to four years later. Dr. Barker claims that these are well-established facts, proved by multitudes of post-mortem examinations; and, moreover, that not a single well-authenticated case has been known of a woman over fifty-five years of age who has given birth to a child, except that of Sarah, the wife of Abraham. Many such have been reported, but none are supported by conclusive evidence; hence the conclusion that the laws of physiology, the experience of mankind, and the decisions of the courts will justify the medical witness in declaring, when questioned in court as to the age during which child-bearing is possible, that a woman over fifty-five years of age is past the period of child-bearing.

In further proof of the fact that though menstruation and ovulation are generally coincident, they do not bear the relation of cause and effect, Dr. Barker stated that the one may exist without the other, as proved by many well-established cases; that cicatrices have been found in ovaries, indicating rupture of Graafian vesicles, many years previous to the appearance of menstruation, and that fresh cicatrices have also been found in old women a long time after the cessation of menstruation; that we have now eight well-authenticated cases in which women have menstruated and continued to do so after both ovaries were removed, rendering ovulation impossible.

In the discussion which followed the reading of the paper, Dr. Caro remarked that during his residence in Sicily the government recognized the possibility of child-bearing commencing at the age of eleven years and two months, and continuing to the age of fifty-four or fifty-five years. He reported that while living there he had personal knowledge of a woman who had given birth to thirty-one children; and that twenty-two of them had sat at the same table. This woman gave birth to her last child when she was fifty-four years old. It was supposed she had a double uterus, from the fact that a child was born every *six months*. Unfortunately when the woman died no post-mortem examination was obtained.

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#### THE PARASITES OF THE FEMALE BREAST.

In a recent work Dr. Haussmann, of Berlin, has given a satisfactory account of all that is at present known on this subject. The *echinococcus* cyst is the only animal parasite found in the female breast; the reports which from time

to time come of the presence of lumbrici and other worms in this organ the author states to be founded on error.

From an analysis of twelve well-authenticated cases of echinococci in the mammae, it was found that in seven cases the right breast was affected, and in five the left. All parts of the gland may be involved except the nipple and its immediate neighborhood. The cysts probably enter the breast from the portal system, through its anastomosis with superficial abdominal veins, by the small veins which anastomose with the portal system. They lie in a rounded cavity formed by the displacement of the lobules of the gland and of the connective tissue between them, with a wall of about one centimetre in thickness. Irritation by friction or otherwise may cause the formation of a sero-purulent or a purulent fluid between the cavity containing the cyst and the cyst itself. In general character the echinococcus resembles that found in other parts of the body. The cyst may be single, or it may consist of a mother cyst and several daughter cysts. The smallest of the mother cysts was as large as an apple; the largest reached the size of a man's fist.

The early symptoms of an echinococcus of the breast are trifling, and the cyst may reach the size of a hen's egg before it causes inconvenience to the patient. Then a feeling of weight and tension in the breast, difficulty of moving the arm, and tenderness on pressure may be complained of. Fluctuation is usually present. The growth of the cyst is very slow; it may remain unaltered in size for years, and then suddenly enlarge, sometimes without assignable cause, sometimes following lactation or mechanical injury. Inflammation may be set up by exploratory incisions or other sources of irritation, and an abscess may form which afterwards discharges a scanty pus, and eventually the cyst may be thrown off, either entire or bit by bit. As a rule, the general health is unimpaired from the presence of the parasite, with the exception of the slight constitutional disturbance arising during the suppurative process.

The differential diagnosis from other tumors of the breast is usually quite easy. Simple cysts are the most difficult to distinguish from echinococci. The prognosis is usually favorable. The treatment is the removal of the cyst by means of a large incision.

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#### MEDICAL NOTES.

— At a recent meeting of the Académie de Médecine, M. Delalain presented a patient wearing an appliance of his invention which he designated by the name of a "facial obturator." The obturator was designed to conceal an enormous loss of substance from the face. The subject, an artilleryman, had had the greater part of his face carried away in 1870, by the explosion of a shell. The appliance was essentially a mask representing on the exterior the central part of the face carried away by the projectile, — the eyes, nose, cheeks, — and was fitted accurately to the parts bordering on the wound. On the interior the mask presented two ventilators designed to give more delicacy to the sense of smell, a sponge intended to absorb the too great humidity of the air in damp weather, a gauze for the purpose of arresting the dust inhaled from



the external air, and a trough attached to the tip of the artificial nose, perforated at its extremity with very many small holes, permitting the moisture from the expired air to be conducted away without reaching the sound skin upon which the lateral borders of the apparatus rested. By means of the contrivance the functions of smell, respiration, voice, and mastication, which had been destroyed or greatly impaired, were completely restored.

— A case has of late been on trial in England in which the defendant, a physician, is entitled to the heartfelt sympathy of the profession, in that besides having himself contracted a terrible disease, and being obliged to pay damages to the amount of £500, he was the innocent cause of injury to a patient who brought a suit against him. The *Lancet* states that in March, 1872, Dr. Davey was called to attend a woman in labor, whom he found to be suffering from syphilis. In delivering her of a still-born child, he unfortunately inoculated his right forefinger, on which there was a slight unhealed wound. Unaware of this fact, Dr. Davey continued in the practice of his profession, and in the following May delivered a Mrs. Simpson, a regular patient of his, of a large, healthy child. The perinæum was slightly torn, and Mrs. Simpson did not make a good recovery, but continued to complain of soreness and discharge, and eventually developed a well-marked secondary eruption. By this time, Dr. Davey was also suffering from secondary symptoms, and he explained to Mr. and Mrs. Simpson his own distressing condition and the mischief he had involuntarily done her. During his necessary absence for the recovery of his health, Mrs. Simpson was treated by another physician; but she afterwards returned to Dr. Davey's care, and he delivered her in October, 1873, of a child which was undoubtedly syphilitic. An agreement was drawn up between the parties that in consideration of Dr. Davey giving his services to Mrs. Simpson without charge, until she was certified by some independent authority to be well, no legal proceedings should be instituted; but some time after, the Simpsons became dissatisfied and commenced an action.

The medical testimony given on both sides, which included that of Mr. Christopher Heath for the plaintiff, and of Mr. Jonathan Hutchinson for the defense, was most decided as to the difficulty of the recognition of a chancre on the finger. In fact, Mr. Hutchinson had been consulted by Dr. Davey before any eruption appeared on his body, and the consultant was doubtful as to the nature of the sore on the finger.

The concluding remarks of Lord Chief Justice Cockburn, who presided during the trial, are mentioned with commendation. In them he expressed the hope that Dr. Davey's professional prospects would not be injured by a trial which had proved him to be blameless.

— About 1730, says the *British Medical Journal*, it was customary to appoint a stone-cutter to the London hospitals, who should also cut for hernia, but should not hold the appointment of surgeon to the hospital, or, in fact, be denominated surgeon, but simply "stone-cutter and rupture-curer." "That brute Ranby," as Queen Anne called him, operated on her Majesty.

— The second annual meeting of the Association of the Alumni of the Albany Medical College was held in the city of Albany, on Tuesday, December 22, 1874. The following officers were elected for the ensuing year: *Presi-*

dent, Dr. John H. Beech (1841), Michigan; *Vice-Presidents*, Drs. Alson D. Hull (1841), New York, B. A. Mynderse (1853), New York, Alexander Shiland (1853), New York, Solomon Van Etten (1853), New York, and Charles L. Spenser (1857), Massachusetts; *Secretary*, Dr. Willis G. Tucker (1870), New York; *Treasurer*, Dr. G. L. Ullman (1871), New York; *Executive Committee*, Drs. H. D. Didama (1846), William S. Young (1841), James H. Scoon (1849), James S. Bailey (1853), M. H. Burton (1853), John H. Hill (1853), Charles H. Burbeck (1859), A. P. Ten Eyck (1866), J. H. Blatner (1872), Oscar Myers (1873).

The address of the retiring president, Professor Didama, of the Syracuse University, was listened to with much interest. In the evening the association partook of its annual supper at the Delavan House, about one hundred and forty graduates being present.

— It is stated that no less than 100,000 leeches are required annually by the French military hospitals.

— A meeting has lately been held to raise £100,000 for the purpose of enlarging the various lecture rooms, and otherwise increasing the accommodations for students, at the University of Edinburgh. Already £70,000 have been subscribed.

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#### LETTER FROM ANN ARBOR.

MESSRS. EDITORS, — A letter from this city which was not largely devoted to matters pertaining to the State university would be a greater novelty than an epistle from Washington during session without mention of Congress. Take away the university from the town, and you would have remaining a place of some six or seven thousand inhabitants, the majority of whom would feel that Ann Arbor's occupation was indeed gone. Almost everybody depends directly or indirectly on the college people for support. Nearly every roof shelters them, and about as many tables are spread with reference to their appetites; for, as there are no college dormitories and no commons, the twelve hundred students are lodged and fed all over the town, which one may with some truth consider as essentially a large collection of boarding-houses. Certainly there is nothing here besides the university to excite a comment or attract attention, excepting always the unique name, which is a perpetual provocative of puzzled inquiry.

In many respects the founders of the university showed their wisdom in locating their institution here. The natural surroundings are exceptionally fine for a place in this region of the country, the ground being more hilly than through the State generally; and the scenery is consequently calculated to make a New Englander feel more at home than he can in the midst of the unbroken levels which so abound hereabouts. But better than the surroundings which please the eye is the undoubted healthfulness of this vicinity. One who expects to find a good deal of malarial disease will be somewhat astonished to ascertain, in answer to his anxious inquiries, that a great many persons

have lived here constantly for a score of years without a touch of ague. The people generally rather resent any imputation of the kind, and assert with some asperity that there is no foundation for such a thought. They will add that years ago, when the country was first opened, there was malaria here, and that there is a great deal even now in some towns nine or ten miles away, but no cases originate here. Still, very many diseases incline toward a malarial type, and occasionally there will appear a genuine case of intermittent, though, as a rule, of a manageable character.

There are three departments in the university: the first, that of Literature, Science, and the Arts; the second, that of Medicine and Surgery; and the third, that of Law. The Pharmacy School, which is reckoned a special course in the college proper, has assumed such proportions within a few years as to deserve to be called a department by itself. In it can be found admirable opportunities for acquiring a knowledge of practical chemistry, botany, crystallography, and other branches which thinking people are beginning to consider essentials for dispensing apothecaries; and these advantages are appreciated to such an extent by the rising generation of pharmacutists, that the capacity of the laboratory, though largely increased this very year, is yet insufficient for the demands made upon it.

About one half the students in the university are residents of Michigan; but almost every other State in the Union has representatives here, and there are numbers from other countries, as Canada, the Sandwich Islands, Africa, Japan, Russia, and Denmark.

In the medical department, in which your readers are naturally most interested, there is a class which numbers over three hundred and sixty,—an advance of fifty on that of last year,—and of these about half a hundred are women. The increase is particularly gratifying as it has occurred in spite of the unfavorable predictions of various individuals who had been closely observing the progress of events. They based their prognostications on the facts that other schools in the West had been making great exertions to augment the number of their students, that the charges in this college were somewhat raised last summer, that the question of introducing homœopathy into the institution was unsettled, and that an entrance examination was to be required. But these gloomy prophets were destined to be most agreeably disappointed in their expectations of a smaller class than usual. It cannot be doubted that men who would otherwise have come here have been induced to go elsewhere, and that neighboring schools have grown somewhat at the expense of this; but their increase from this source has been minute, and the loss here has been scarcely appreciable. The annual fees were formerly a mere bagatelle, and have been raised so slightly that the payments now demanded are amazingly small for the advantages presented, and can scarcely deter the most impetuous.

The homœopathic matter has given the friends of the medical department, and, indeed, of the entire university, great anxiety for a long time. Some years ago the legislature passed an enactment establishing two chairs of homœopathy in the university. But it was one thing to make the law, quite another to enforce it. The board of regents saw at once that the introduc-

tion of such an element of discord would not only be the perfect ruin of the medical school, but that it would also bring disaster to all the other departments. If the legislature was to be allowed to usurp the powers of the regents, there would be a speedy end to the success of an institution which had hitherto led the van among State universities. So the board declined to comply with the provisions of the law. They expressed a willingness to establish a medical school, entirely distinct from the one already in operation, and make it homœopathic throughout, whenever the State should supply the money requisite for that purpose. But the legislature was not disposed to make so great an outlay as that project necessitated, and the homœopaths have been endeavoring by various means to compel the regents to obey the law. The board being elected by popular vote, measures were taken which resulted in the choice of men with decided homœopathic sympathies. But nothing came of it; for, in nearly every instance, when the new regents perceived the real bearings of the case on the welfare of the great interests which were placed under their guardianship, they flatly refused to jeopardize the prosperity of the university, as they saw they must if they acceded to these absurd claims. Then the case was carried to the courts. One process after another was tried without success, and finally, this autumn, the case was argued before the full supreme bench, with the result of a refusal of the judges to grant the requested mandamus to compel the regents to appoint the homœopathic professors. So there the matter rests, greatly to the relief of the friends of the university and of sound medical teaching everywhere.

Now, as to the entrance examination. It is believed that this is the only medical school in the country where anything of the kind is required. Strange as it seems to one who considers the physician's need of a sound education, the greatest dullard may enter almost any medical school in the United States without a question as to his ability to understand what he will see and hear. Let me tell you of the examination of one of the candidates this year. He was nineteen years old, had been to school four years, and had studied medicine one year with his father, a physician in active practice. In answer to questions he said that Germany was in South America; Europe, Asia, and Africa were also there; Russia was in North America, about five hundred miles from New York city; England was in Russian North America; New Orleans was northeast from Indiana; water freezes at thirty-three degrees below zero, and boils at one hundred and two above; the torrid zone is hotter than the frigid on account of climate; summer is warmer than winter because of temperature; all animals are called quadrupeds; mosquito is spelled m-o-c-q-t-o; and if two apples cost three cents, twelve will cost thirty-six cents. He could not give the boundaries of his native State. Indeed, the only questions which he answered correctly were as to the capital of his State, and the location of the Amazon — with which, it is fair to remark, he associated the Nile and the Niger. Of course it is unnecessary to say that he was rejected; but it is pertinent to add that he departed in high dudgeon at the action of the faculty, evidently thinking that he had passed a very creditable examination, and declaring his intention to immediately favor a certain other school with his presence and patronage, which he is probably doing at this moment. In point of

fact, it is positively known that the class in a neighboring school has been increased by reason of this feature at Ann Arbor, and it is likely that the same thing has occurred in a number of others. Justice requires the statement that the illustration just given is by far the most prominent display of ignorance yet made, and that such a degree of density is by no means requisite for rejection. But you would rightly judge that the examination is upon the merest rudiments of an English education. That it is almost ridiculously small must be admitted; but the fact should also be recognized that it has resulted in the refusal to admit a number of men who in some cases, to be sure, have gone to other institutions, in others, it is hoped, have been awakened to a sense of their deficiencies and have relinquished professional study, at least until they have gained a decent basis for it. The entering end of the wedge is always thin, but it is proposed to drive it in a little farther every year, just as long as the profession in this region will give countenance and support to the movement. That it is in the right direction, nobody who has given the least thought to the subject can doubt. Medical teachers, especially, knowing as they best can the extent to which the standard of medical education is lowered by the necessity of adapting the instruction to the capacity of a lot of students who are poorly prepared, or rather not prepared at all, will look upon these efforts with interest and wish them success.

One of the most interesting points about the university is the trial, on an extensive scale, of the experiment of co-education. Women are admitted to all the departments on a perfect equality with men, and both sexes attend all exercises together, except in the medical school. In this, the lectures are given separately to the male and female students, save only on chemistry, a subject which nobody thinks it improper or unadvisable on any account for men and women to study together. The results on every hand have thus far been eminently satisfactory. The women take high rank, and have given no evidence of impairment of bodily vigor in consequence of the rigorous course of study, nor of loss of the peculiarly feminine traits which so many have feared would be imperiled in acquiring an education with their brothers. These statements are particularly applicable to the women in the medical department. No one is at all surprised now to have them carry off a large share of the honors, and all the professors are agreed that, as a class, they stand higher in the quizzes than the men. This is attributable, to a great extent, to their superior preliminary education — a most striking circumstance in favor of the enforcement of entrance examinations. Many of them have had a large experience in teaching, a number are wives of physicians, and almost all are of an age which usually brings with it seriousness of purpose and strength of mind, if these qualities are ever to be possessed. The matriculation-book shows some interesting facts on this last point. The oldest man in the medical class is forty-six; the oldest woman, fifty. The youngest man is eighteen; the youngest woman, nineteen. The men average twenty-four and a half years; the women, thirty years. The average age of the entire class is twenty-five. Dividing them according to age into semi-decades, it is found that the majority of the men are between twenty and twenty-five; while the period of five years which includes the greatest number of women is that between thirty and thirty-five. Probably

this difference in age will become less and less marked as the prejudice against the medical education of women diminishes, and their fitness for the practice of the healing art is more fully demonstrated.

F. H. G.

ANN ARBOR, MICH., December 11, 1874.

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### WEEKLY BULLETIN OF PREVALENT DISEASES.

THE following is a bulletin of the diseases prevalent in Massachusetts during the week ending January 2, 1875, compiled under the authority of the State Board of Health from the returns of physicians representing all sections of the State: —

In Berkshire the most prevalent diseases were pneumonia, whooping-cough, and mild bronchitis. Rheumatism, typhoid fever, and croup were also reported, mild in type and limited in extent.

In the Connecticut Valley, bronchitis, diphtheria, influenza, pneumonia, and rheumatism are reported.

In the Midland section (Worcester County) bronchitis, diphtheria, influenza, pneumonia, rheumatism, and whooping-cough prevail. A few reports of croup, scarlatina and typhoid were received, but these diseases were not prevalent.

The Metropolitan district, embracing Boston and its suburbs, has bronchitis, measles of a mild type, scarlatina, rheumatism, pneumonia, and whooping-cough as its prevalent diseases. Measles is epidemic. Cases of croup, diphtheria, typhoid fever, tonsillitis, mumps, and chicken-pox are reported by a small minority.

In the Northeastern section (Middlesex and Essex counties) we have almost precisely the same prevalent diseases as those in the Metropolitan district.

Along the South Shore, and on the Cape, bronchitis, influenza, whooping-cough, scarlatina, and pneumonia prevail.

In the Island counties a gratifying absence of disease is noted, bronchitis of a mild type being the only prevalent ailment.

From the foregoing it appears that bronchitis is everywhere prevalent; diphtheria is in the western and middle parts of the State; influenza is in all parts; measles is epidemic in the Metropolitan and Northeastern sections; pneumonia and rheumatism are quite general; scarlatina prevails to a limited degree in the eastern part of the State; whooping-cough is quite general; and tonsillitis, mumps, and chicken-pox have a limited prevalence in the eastern counties.

F. W. DRAPER, M. D., Registrar.

The following is a bulletin of the diseases prevalent during the week ending January 9, 1875: —

In Berkshire: diphtheria, croup, and influenza, all of them of severe type.

In the Connecticut Valley: bronchitis, diphtheria, whooping-cough, pneumonia, rheumatism, and scarlatina.

In the Midland section (Worcester County): bronchitis (severe), pneumonia, whooping-cough, influenza, scarlatina, diphtheria, and croup.

In the Northeastern sections (Middlesex and Essex): mild bronchitis and influenza, measles, pneumonia, diphtheria, and whooping-cough.

In the Metropolitan district: measles (epidemic), rheumatism, pneumonia, bronchitis, scarlatina, and whooping-cough. A few reports of severe diphtheria were received; returns of "mild" diphtheria very probably belong with the reports of tonsillitis, which latter affection appears to be quite prevalent.

In the Southeastern sections: whooping-cough, pneumonia, bronchitis, scarlatina, measles, and typhoid.

Upon a general survey of the State, we find that bronchitis is most prevalent in the middle and eastern parts; diphtheria in the western; measles in Suffolk, Middlesex, and Essex counties; rheumatism, scarlatina, and whooping-cough universally in the sections east of the Connecticut.

Comparing the present with the last week, we find an increased prevalence of the following diseases reported: measles, croup, and tonsillitis. The following are less prevalent: bronchitis, pneumonia, influenza, rheumatism, whooping-cough, scarlatina, and typhoid. Diphtheria remains as at the last report.

F. W. DRAPER, M. D., Registrar.

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COMPARATIVE MORTALITY-RATES FOR THE WEEK ENDING JANUARY 2, 1875.

	Estimated Population.	Total Mortality for the Week.	Annual Death-rate per 1000 during Week.
New York . . . . .	1,040,000	584	29
Philadelphia . . . . .	775,000	306	21
Brooklyn . . . . .	450,000	229	26
Boston . . . . .	375,000	159	22
Worcester . . . . .	50,000	19	20
Lowell . . . . .	50,000	23	24
Cambridge . . . . .	44,000	21	25
Fall River . . . . .	34,200	15	23
Lawrence . . . . .	33,000	7	11
Springfield . . . . .	33,000	11	17
Lynn . . . . .	28,000	18	33
Salem . . . . .	26,000	4	8